

**Sandralyn Bailey**

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**From:** Joan George [george@fhhlaw.com] Federal Communications Commission  
Office of the Secretary  
**Sent:** Wednesday, February 14, 2007 4:35 PM  
**To:** Kevin Martin; Michael Copps; Jonathan Adelstein; Deborah Tate; Robert McDowell; Heather Dixon; Bruce Gottlieb; Rudy Brioche; Chris Robbins; Cristina Pauze; Monica Desai; roy.steward@fcc.gov; Peter Doyle; James Bradshaw; Susan Crawford  
**Subject:** FW: Written Ex Parte Submission of Polnet Communications, Ltd., MM Docket No. 99-325  
**Attachments:** Written Ex Parte Submission of Polnet(2).pdf

Attached is the second part of this submission.

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The measurement location was at Latitude 40 deg 52 min 5.6 sec, Longitude 73 deg, 47 min, 42.2 sec, which is 1.22 km from the WCBS transmitter tower. The heading to WCBS from the test site was 141 deg true.

The procedure used by Broadcast Signal Lab for measuring the WCBS HD Radio™ sidebands is that specified in NRSC-5<sup>3</sup>. Table 2 summarizes the AM Hybrid HD Radio™ Spectral Emission Limits specified in NRSC-5.

Lower Freq Offset (kHz)	Upper Freq Offset (kHz)	Measured Power Spectral Density Shall not Exceed (dBc in 300 Hz Resolution Bandwidth, 30 second average)
5.0	10.0	-34.3 dBc
10.0	15.0	-26.8 dBc
15.0	15.2	-28 dBc
15.2	15.8	-39 - (offset frequency in kHz - 15.2) x 43.3 dBc
15.8	25.0	-65 dBc
25.0	30.5	-65 - (offset frequency in kHz - 25) x 1.273 dBc
30.5	75.0	-72 - (offset frequency in kHz - 30.5) x 0.292 dBc
75.0	And up	-85 dBc

**Table 2 – AM Hybrid HD Radio™ Spectral Emission Limits**

The instruments used for these measurements were an Advantest model R3465 spectrum analyzer S/N 82420196 and Chris Scott & Associates model LP-3 loop antenna S/N 080406. The spectrum analyzer was last calibrated by Advantest on 19 December 2003.

In Figures 3 through 5 the data capture time was approximately 60 seconds<sup>4</sup> at 120 msec per division continuous sweep with the spectrum analyzer in “averaging” mode. The vertical scale is 10 dB per division and the horizontal scale is 5 kHz per division (50 kHz total span). The analyzer resolution bandwidth was 300 Hz and the video filter was turned off (by setting the video bandwidth to 300 Hz). The unmodulated carrier level was set at the top horizontal line of the display. The plots were made between 11:54 AM and 11:58 AM EDT and were stored in the PC Card memory of the analyzer.

<sup>3</sup> National Radio Systems Committee, *In-Band/On-Channel Digital Radio Broadcasting Standard NRSC-5* (April 2005), available at <http://www.nrsstandards.org>

<sup>4</sup> NRSC-5 recommends a minimum 30 seconds averaging time. 60 second averaging time used here was selected to provide additional smoothing of the data.

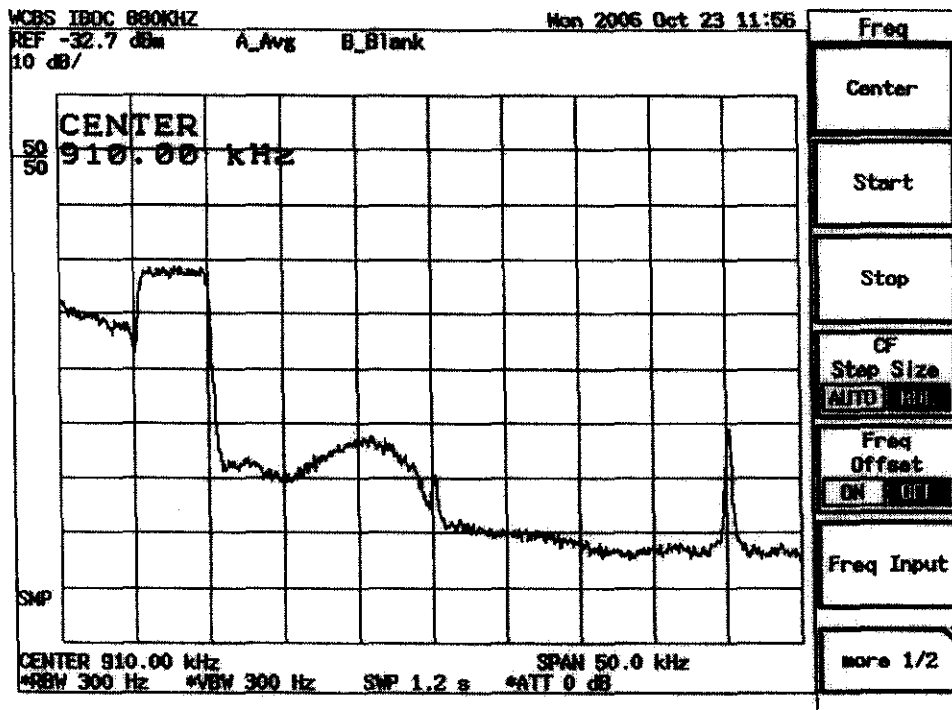


Figure 3 – WCBS HD Radio™ Upper Sidebands

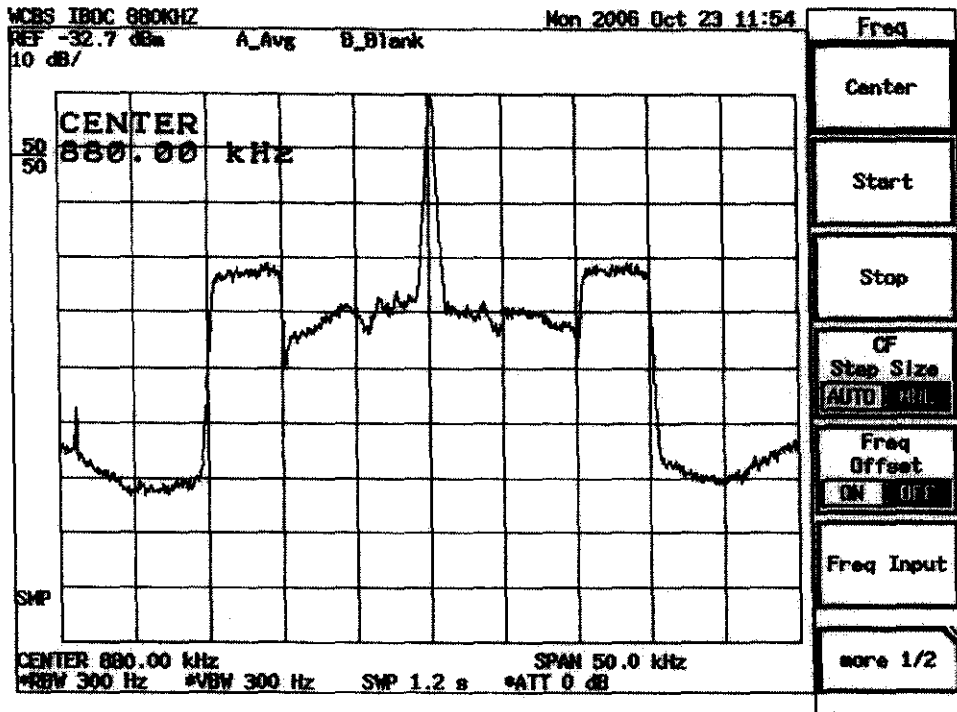


Figure 4 – WCBS HD Radio™ Sidebands (centered on 880 kHz)

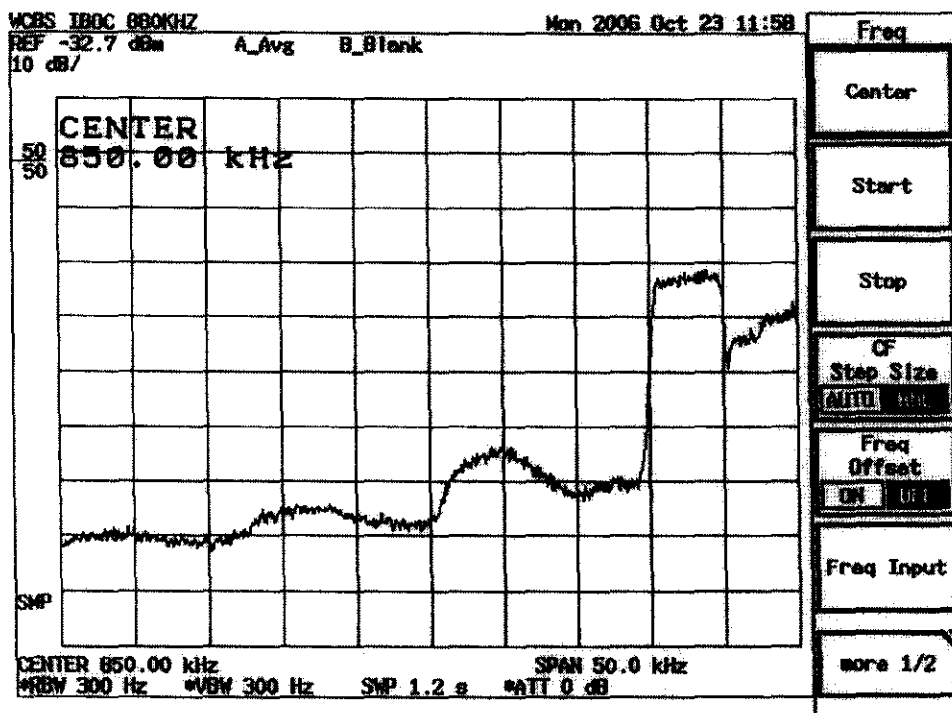


Figure 5 – WCBS HD Radio Lower Sidebands

### Primary Digital Sidebands

Figures 3, 4, and 5 show that the measured power spectral density of the primary digital sidebands (10 to 15 kHz offset from the carrier) is -32 dBc or less, at least 5 dB below the NRSC-5 specification of -26.8 dBc.

Furthermore, observe that there is some amplitude asymmetry in the primary digital sidebands, indicating that the WCBS transmission facility exhibits some roll-off in its lower sideband response. This likely arises from the diplexer filters, which permit WCBS and WFAN to share one antenna tower.

The carrier of WRKL can be seen in Figure 3 at 910 kHz. However it is in the null of the Scott loop antenna at this location so that nothing can be inferred about its level relative to WCBS from this plot.

### Spectral Regrowth Sidebands

Figures 3 and 5 show that the measured power spectral density of the "spectral regrowth" digital sidebands (20 to 30 kHz offset from the carrier, centered on 25 kHz offset) is -62 dBc or less, which exceeds the NRSC-5 limit of -65 dBc. These sidebands are co-channel with the WRKL signal, which occupies 900 to 920 kHz.

Also of technical interest is the appearance of additional spectral regrowth centered at 37.5 kHz below the WCBS signal at a level of -75 dBc, just meeting the NRSC specification. For the upper sideband the signal at +37.5 kHz offset is at a level of approximately -80 dBc. On the lower sideband, this signal is at a level of approximately -76 dBc.

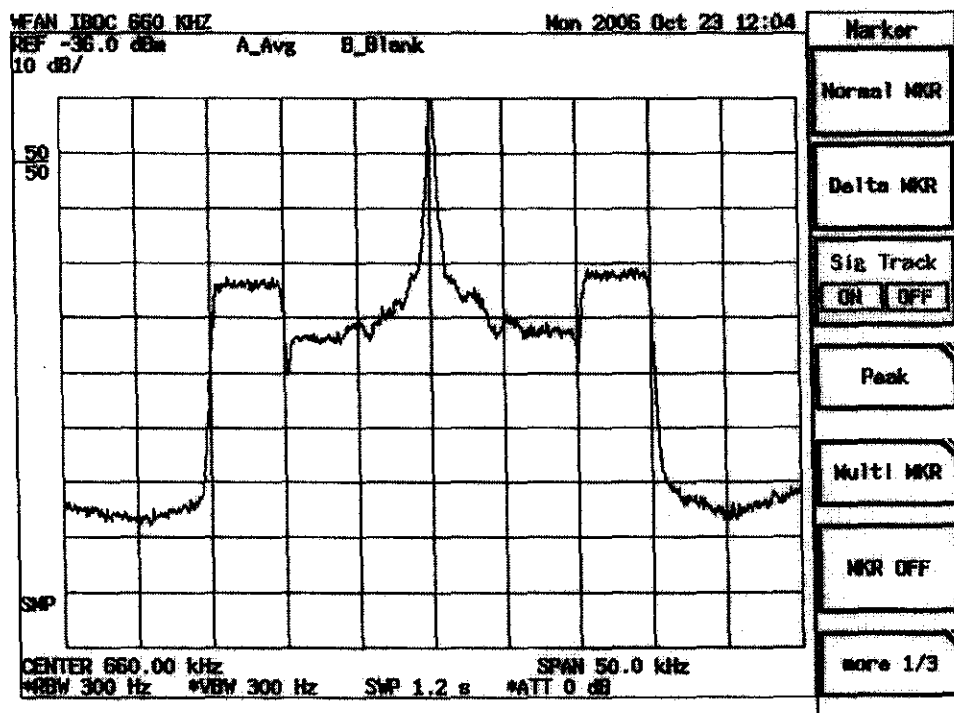
Additional spectral regrowth can be seen at a level of about -80 dBc centered on 50 kHz below the WCBS carrier. This meets the NRSC-5 specification.

The analyzer noise floor was about -90 dBc (in a 300 Hz bandwidth) at the settings used for plotting Figures 3 through 5.

### ***WFAN Spectrum Plots***

The spectrum of the signal from radio station WFAN (660 kHz) was measured in the same manner as that of WCBS discussed above. The results are shown in Figures 6, 7, and 8 below.

Notice that the spectral regrowth sidebands of the WFAN signal are at -72dBc, or less. This is appreciably below the level of those sidebands in the WCBS signal. The WFAN primary digital sidebands are at approximately the same level as those of WCBS.



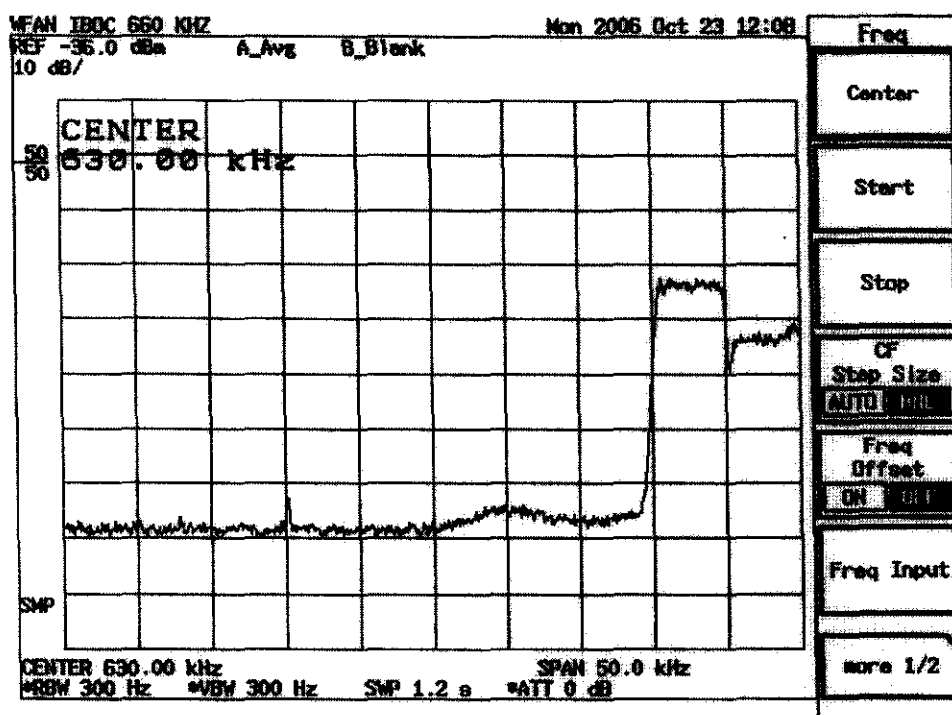


Figure 7 - WFAN HD Radio Lower Sidebands

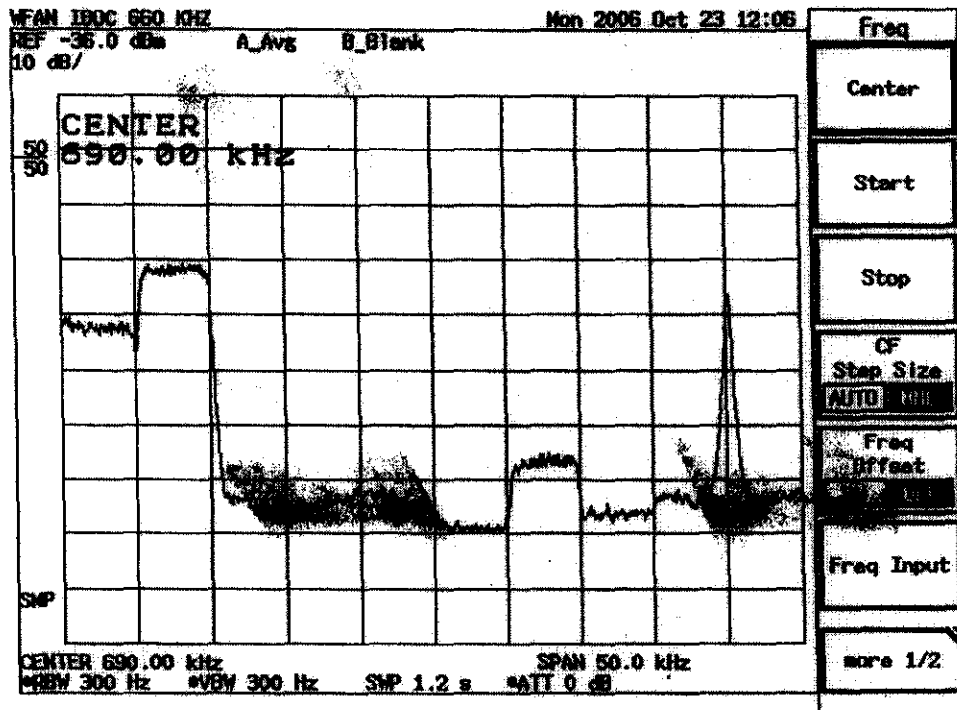


Figure 8 - WFAN HD Radio Upper Sidebands

The signal at 710 kHz in Figure 8 is the HD Radio signal of radio station WOR.

### Conclusion

Digital "hash" can be heard on the WRKL signal within its 0.5 mV/m protected contour. This digital hash may be produced by the upper spectral regrowth sideband of WCBS, which is approximately 10 dB out of specification. The upper spectral regrowth sideband of WCBS is co-channel with the WRKL signal.

Measurements of co-channel interference from WCBS suggest that it should be technically feasible to attenuate the WCBS upper spectral regrowth sidebands by an additional 10 dB, which may provide a significant reduction in the interference that WRKL is receiving within its protected 0.5 mV/m contour.

However, an unresolved question at this time is whether the mechanism responsible for the WRKL interference arises from inadequate second-adjacent channel selectivity in typical broadcast receivers that are being used for the reception of WRKL. The upper primary digital sideband (890 to 895 kHz) of the WCBS signal falls within the lower second-adjacent channel of WRKL. In contrast with second-adjacent channel "audio

splatter" which tends to occur with a low duty cycle, the WCBS digital sidebands are present 100% of the time, and hence are much more noticeable to the WRKL listener.

### **Certification**

Lewis D. Collins certifies that he is a Senior Radio and Telecommunications Engineer with Broadcast Signal Lab., LLP. He has been doing business as a radio frequency engineering consultant as RLC Consultants since 1994 with offices located at 10 Marshall Terrace, Wayland, MA 01778-1104. He previously held communications engineering positions with Tiernan Communications, Inc., Wang Laboratories, Inc., and the Massachusetts Institute of Technology. He holds the degree of Bachelor of Science in Electrical Engineering from Purdue University, and the degrees of Master of Science and Doctor of Science in Electrical Engineering from the Massachusetts Institute of Technology. He holds a lifetime General Radiotelephone Operator's License (PG-1-8954), and formerly held a Radiotelephone Operator's License, First Class (P1-1-21144). He is a Life Member of the Institute of Electrical and Electronics Engineers (IEEE), a member of the Society of Broadcast Engineers (SBE), and a Senior Member of the National Association of Radio and Telecommunications Engineers (NARTE). He holds NARTE certification as a Master Radio and Telecommunications Engineer in Broadcasting, Cable Television, and Computer Communications (E1-02247). He has been certified by SBE as a Certified Broadcast Technologist (CBT).

This report was prepared by him personally and is true and accurate to the best of his belief and knowledge.

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Lewis D. Collins  
November 6, 2006